



# **Host Communities: siting and effects of facilities**

## **An analysis of host community experience of the Paraparaumu Waste Water Treatment Plant and Effluent Discharge**

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## **ACKNOWLEDGEMENTS**

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# **A: Introduction to this case study**

## **Public Good Science Fund Research**

The research team at Taylor Baines & Associates was contracted by the Foundation for Research Science and Technology to carry out a piece of social research concerning the siting of Waste Water Treatment Plants (WWTP) and disposal facilities. The research has been funded out of the Public Good Science Fund.

Spread over three financial years - 1998 to 2001 - the research programme aims to assist the processes of urban and rural planning (as it applies to future waste disposal infrastructure) by developing a body of knowledge on key social factors that are relevant to the siting and operation of WWTP facilities.

This case study addresses part (Questions 2 & 3 below) of the overall research objectives. In total, the research programme is intended to answer three core questions -

1. Is there a systematic pattern of WWTP siting in NZ. If so, how would you characterise this historical pattern from the social perspective of host communities?
2. How do actual effects compare with effects that were projected at the time of siting?
3. What have been the longer-term effects on host communities of WWTP and disposal operations?

This research on WWTPs is part of a longer-term research programme currently being funded by the Public Good Science Fund into the siting and social impacts of a range of facility types. During the period 1997 to 2000, research was carried out on solid waste facilities - landfills and transfer stations. During 1998 to 2001 the research has focussed on waste water facilities. From 2000 to 2002, additional types of facilities are being investigated (Please refer to the TBA website - [www.tba.co.nz](http://www.tba.co.nz) - for more information.)

The research programme has received the strong endorsement of Local Government New Zealand, the New Zealand Water and Wastes Association, the Ministry for the Environment, as well as several territorial local authorities.

## **Reasons for this research programme on facilities and their host communities**

It is a common experience that assessing the effects of WWTPs and disposal options at the time of site selection is a contentious process. The debates that surround such assessment activities are often informed more by prejudice and a strategic selection of hearsay information than by well-founded evidence.

This research aims to address both questions of possible social bias in site selection and lack of experienced-based information relevant to New Zealand communities. It is to be hoped that these

objectives will be served by carrying out the research in a setting which is quite removed from the tensions of resource consent applications, and by a team of independent researchers who have no organisational affiliation with either the developers of such facilities (usually but not always territorial local authorities) or the host communities involved.

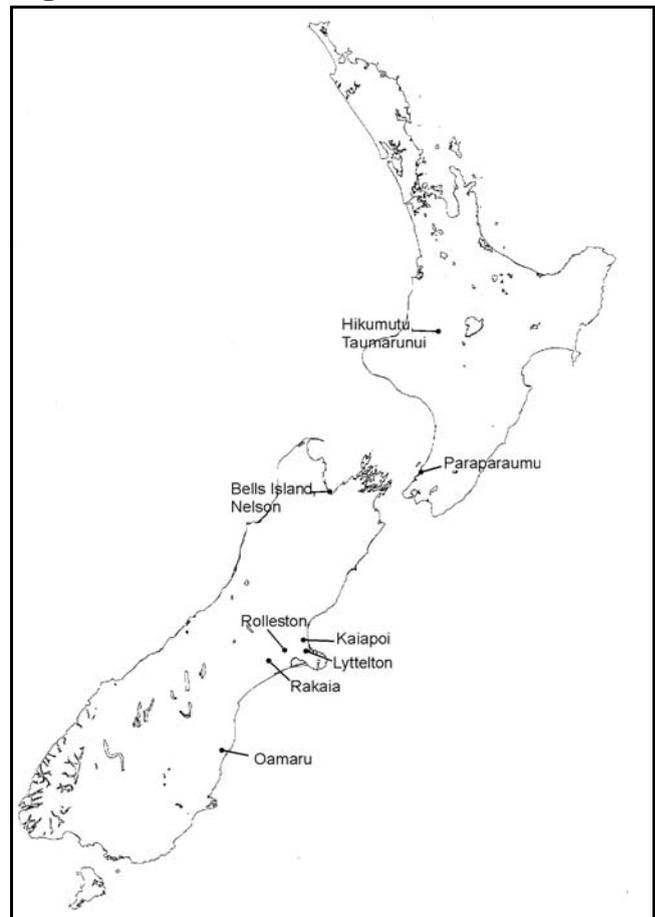
## Purpose of the case studies

This case study on the Paraparaumu WWTP on the Kapiti Coast is one of eight such case studies being undertaken as part of this research programme<sup>1</sup>, as shown in Figure 1. The case studies were selected to provide a range of relatively recent technology in terms of New Zealand applications, and a range of disposal media (rivers, estuaries, ocean, land, wetlands). Because of the requirement to avoid facilities involved in active resource consent proceedings or undergoing construction activities, most of the main metropolitan WWTPs could not be included in the case study work at the present time. As a result, the sample comprises mainly relatively small capacity facilities. However, it does include a variety of technology types and effluent disposal media. This makes the research particularly relevant to the increasing numbers of smaller communities which are being required to develop or upgrade reticulated sewerage systems.

Each case study has been conducted at a time which avoids conflicts with active resource consent proceedings. Care has been taken in the social assessment research method to provide accurate<sup>2</sup> and useful descriptions of the effects experienced

by host communities, by canvassing a wide range of local observations, by accessing other relevant data sources where possible to corroborate the observations of neighbours, (and by engaging in a process of feedback preliminary findings for checking and validation by the research participants). As a result, the experience documented in these case studies should neither overstate nor understate the experience of the host communities involved. This is important, if the research is to assist participants in future planning.

**Figure 1: New Zealand Case Studies**



<sup>1</sup> The full list of case studies includes Oamaru, Kaiapoi, Rolleston, Rakaia, Bell's Island (Nelson/Tasman), Paraparaumu, Hikumutu (Taumarunui), and Lyttelton.

<sup>2</sup> The use of percentage figures in this case study is not intended to imply statistical analysis. Rather it should be interpreted for comparative purposes merely as indicating the proportion of respondents in any particular area of interviewing who gave a specified response.

Nevertheless, the case studies each represent experience at a particular point in time. The research process itself, and the case studies resulting from the research, have the potential to trigger changes in the way the facilities are operated and managed. Thus it is important to interpret the findings of each case study in the context of the way the facility was operated and managed at the time of the case study fieldwork<sup>3</sup>.

It is also important to keep in mind the perspective of this research - the host community perspective. Primary emphasis has been put on capturing the experience of members of the host community - the community of residents and businesses in relatively close proximity to the Paraparaumu WWTP. It is their experience of the off-site effects such as odour and noise, and the impacts of such effects that will be useful to others contemplating the siting of a new waste water facility. By the same token, there are likely to be some off-site effects such as risks to groundwater quality that will not necessarily be informed by a focus on neighbours' experience, simply because such phenomena are not often readily detectable to casual observation, even if they do occur.

## Methodology for the case studies

The research method drew on the practical and theoretical approach to social assessment described in Chapter Four of "Social Assessment: theory, process & techniques" (Taylor et al., 1995). Stages in the research included scoping the particular cases to clarify the appropriate time frame and communities of interest, community profiling, a structured survey of nearby residents and business people, in-depth key informant interviews, and accessing a range of existing data sources.

A structured questionnaire was developed to gather detailed information about the experience of many individuals living in the host community. The questionnaire explored people's experience of day-to-day operational effects of the WWTP, their perceptions of how the presence of the WWTP has impacted on the longer-term development of the host community, and their knowledge of what has happened in their community during the years prior to and since the WWTP was established. The detailed analysis is descriptive and sometimes quantitative, but not statistical in nature<sup>4</sup>.

In carrying out the comparative case assessments, the assessment team had to address several issues relevant to interpreting the results and their usefulness in providing valid comparative information. These included the debate about 'perceived' or 'real' effects, the need for corroboration, and the importance of timing or context as a potential influence on individual responses.

The assessments focussed on people's experiences of living or working near waste management facilities. The results are therefore based on a large body of individual perceptions of effects. In some feedback discussions, the distinction was made that these effects are "*only people's perceptions; they're not necessarily real.*" The question arises therefore as to what is the difference between a 'perceived' effect and a 'real' effect. Can 'perceived' effects ever become 'real' effects? In practical terms, the assessments identified clearly the proportions of those interviewed who experienced certain types of effects. Furthermore, wherever possible, the assessment sought to investigate these effects from other respondents and from independent sources (e.g. local key

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<sup>3</sup> The fieldwork dates are noted explicitly in the case study report. Furthermore, the report attempts to describe as fully as possible the operating regime at the time of the case study.

<sup>4</sup> A statistically-based analysis would have increased the scale of field work and cost several fold.

informants; secondary data records) or different perspectives (e.g. the facility operator)<sup>5</sup>. As researchers, it was pleasing to note how, in the great majority of cases, neighbours' experience was strongly corroborated by the perceptions and experience of the facility operator.

A number of factors have a bearing on individual experiences. Different people have different thresholds for noticing effects depending, for example, on their ability to hear or to smell, or on their perception of what is 'exceptional'. Increasing sample size addressed this factor. Different living or recreational patterns are likely to influence people's experience of effects - whether they are on the property all day, every day, or working off the property. Day-time interviewing addressed this factor by increasing the likelihood of including individuals with a relatively high rate of occupancy. People get used to effects after a while - they can seem less exceptional. Following unprompted questions with prompted questions addressed this factor, by allowing interviewees 'a second chance' to respond.

Does the distinction between 'perceived' and 'real' effects matter? The primary purpose and value of comparative case assessment is to answer two types of questions - (i) if neighbours around a facility are experiencing certain effects, and finding that they have unacceptable impacts, what can be done to reduce or eliminate the effect, or make it less likely to happen? and (ii) if neighbours around Existing Facility A experienced certain effects and impacts from its operation, what is the likelihood that neighbours around Potential Facilities B, C or D will experience similar effects and impacts? In either situation, whether such effects are labelled as 'perceived' or 'real' is probably immaterial. However, from a "technical" perspective, replication of reported effects is important to their validation, while from a "political" perspective, the perceptions of just a few people affected can be sufficient to galvanise social action.

It is also important to remember that technical experts are not necessarily in a position to offer any more than assessments of 'perceived' effects. In the case of technical experts, their perceptions are derived with the aid of technical lenses (i.e. frameworks for analysis used by the technical expert). For example, an acoustical engineer can provide measures and predictions of likely noise levels at certain distances away from the source of the noise. The acoustical engineer is not usually in a position to draw any inferences as to likely social impacts associated with these levels of noise.

The tendency for potentially affected parties to distort or exaggerate the likelihood of effects when participating in EIA activities is not an uncommon experience for SIA practitioners. Indeed, in one of the earlier solid waste comparative case studies, background documentation from an environmental tribunal declared this point explicitly. In these comparative case assessments, this factor was addressed by ensuring that all the case studies were carried out on facilities which had no consent applications or reviews in progress.

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As a matter of assessment methodology, we have adopted the stance that unless more than two individual neighbours reported and corroborated the same effect, or unless a neighbour's observation could be corroborated by an independent source, the effect would not be reported in detail, but simply noted. This reflects the stance that, while social assessment acknowledges the importance of individual observations, such observations still need to be subject to verification.

## **Outputs of this research programme**

Outputs from this research have taken the form of public presentations and discussion sessions, as well as a range of hard copy formats.

The latter include a series of research Working Papers, conference papers, and an abbreviated summary document for each case study.

## **The research provider - Taylor Baines & Associates**

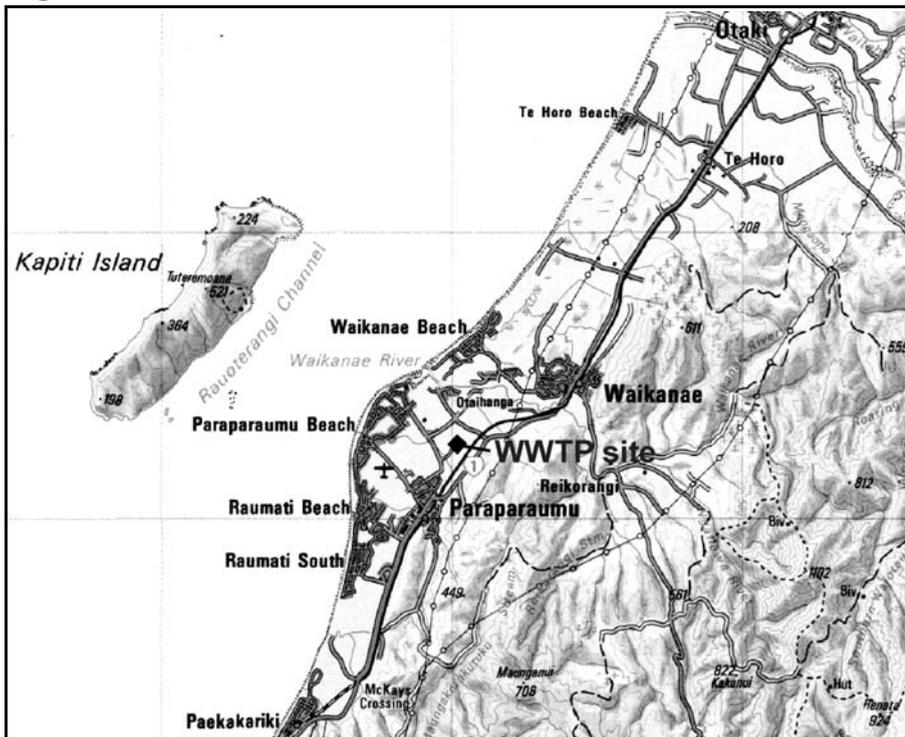
Taylor Baines & Associates has been a private provider of research, consulting and training services since 1989. The firm specialises in social research and the application of social assessment methods to a wide variety of issues in community development.

# B: History and description of the facility

## Location

The Paraparaumu WWTP is located west of SH1 and on the northern edge of Paraparaumu 45 kilometres north from Wellington. It is accessed off Mazengarb Road at Fyfield Place. The plant is situated in a semi-rural area amongst lifestyle blocks, farms and residential development. Its northern boundary adjoins the Paraparaumu landfill. The site is bordered by an extensive pine plantation.

**Figure 2: Location of WWTP**



## Planning

Local government amalgamation in 1989 saw the formation of the Kapiti Coast District Council (KCDC) out of three territorial local authorities - the Horowhenua District Council (which included Waikanae), the Otaki Borough Council and the Kapiti Borough Council.

As described in the following section, the Paraparaumu WWTP has been subject to a series of upgrades since it was built in 1981. These have been aimed at increasing the capacity of the plant as well as trying to address problems with odour. A series of planning documents<sup>6</sup> record the following environmental and social effects:

- **bacteriological water quality** in the Mazengarb and Tikotu Drains have been affected by the effluent discharge. The discharge is not at recreational and shellfish eating requirements.

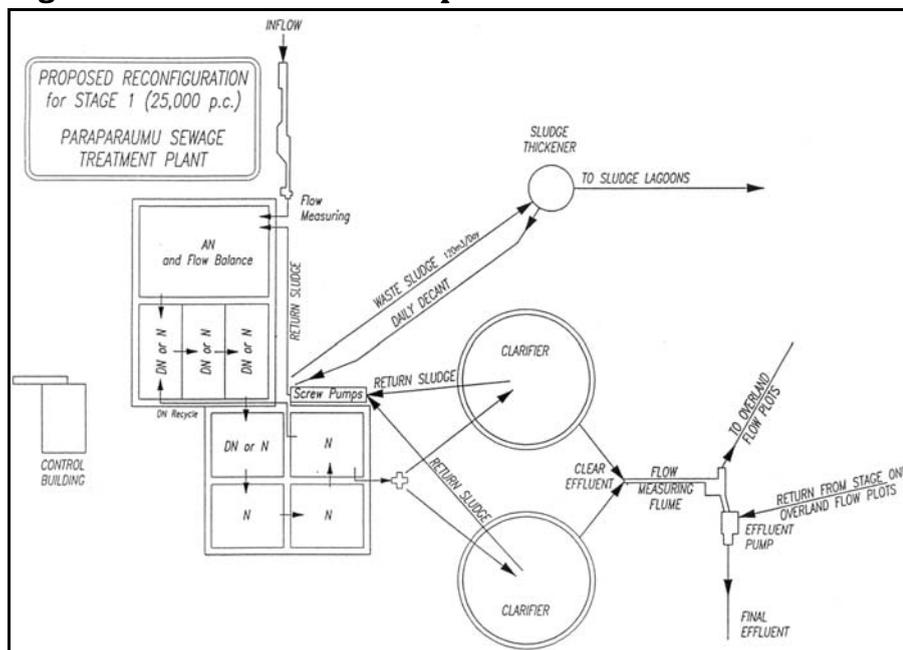
<sup>6</sup> Duffill Watts & Tse Ltd (1992), Duffill Watts & Tse Ltd (1996), Kingett Mitchell & Assoc. Ltd (1998)

- **nutrient levels** in the effluent may increase the incidence of **algal blooms** in the Waikanae River at times<sup>7</sup>. There will be a limit as to the load which can be accepted by the Waikanae River.
- there is insufficient information on **water clarity** and colour in the lower estuarine reaches of the river to reach a conclusion with respect to the impact of the discharge from the Mazengarb Drain.
- sludge disposal methods have tended to cause **odour** and are likely to become more problematic with a growing population.

## Site History and Waste Water Treatment Operations

The Paraparaumu WWTP was first commissioned by the Kapiti Borough Council in August 1980, based around an extended aeration basin. The plant's capacity was later increased with the addition of a clarifier unit. The next upgrade took place in 1994/95, after the local councils had amalgamated. This involved construction of a biological nutrient removal plant, and modifications to the sludge ponds and inlet channel. This upgrade was completed on 7 Feb 1995, since when the plant has operated with the same basic configuration.

**Figure 3: Schematic of Paraparaumu WWTP**



Waste activated sludge has been pumped to holding ponds for consolidation and stabilisation where it is held for more than two years before disposal to the landfill. According to the wastewater treatment manager “*odour has always been associated with this process*”, particularly in the warmer

<sup>7</sup> Even if treated effluent is diverted out of the river it should not be assumed that algal blooms will necessarily cease, due to other sources of nutrient discharge into the river.

summer months. However, with the introduction of a dissolved air flotation unit (commonly referred to as the DAF system) in mid 1997 the odour problem worsened. *“Although the DAF achieved a much thicker sludge (3.5 to 4% dry solids) this was full of air - much like the consistency of blancmange”*. Deodorising sprays proved ineffectual in masking the odour from the sludge ponds, and on 27 January 1998 an abatement notice was served on the manager of the Paraparaumu WWTP.

A large polyethylene cover over the ponds was put in place on 3 February 1998 with bales of hay (made on site) both weighting it and acting as a bio-filter. This polyethylene cover has not proved strong enough and splits have occurred<sup>8</sup>. In order to prevent odour escaping more hay was spread over the exposed sludge. The site had originally also accommodated three trial wetland areas. However the plants in these were destroyed by pukekos and the ponds are now used for sludge storage. In September 1998 sludge from the first covered pond was pumped into these ponds and a layer of hay between 200 and 300 mm thick was spread over it.

In 1999 after much investigation of options for both Waikanae and Paraparaumu, the KCDC proposed to transfer Waikanae sewage to the Paraparaumu WWTP. In order to do this, as well as remedy the existing sludge-related odour problems, the plant will need a further upgrade. The design capacity is for 25,000 population equivalents, while currently running at 21,000. The sludge ponds are to be decommissioned with this next upgrade, scheduled for completion in 2001. The upgrade also involves a dedicated sludge-vitrification facility<sup>9</sup> on site known as the Lemar facility. The facility was close to being commissioned at the time of the case study fieldwork.

Because the reticulated sewerage system covers a large flat area, there are ninety-six pumping stations required to transfer raw sewage to the WWTP.

## **The present situation (2000)**

Kapiti Coast District Council discharges treated wastewater from the Paraparaumu WWTP into the Mazengarb Drain. The Mazengarb Drain flows through the catchment surrounding the WWTP in a west to north-west direction and enters the Waikanae River at the location known as the Oxbow, adjacent to Otaihanga Road. The discharge to the Mazengarb Drain was consented in December 1993. The current resource consent for discharge into the Mazengarb Drain expired in March 2001.

The Paraparaumu WWTP is owned and operated by the Council. A complement of nine staff working on site includes one manager, three operators for all the plants, one supervisor, one labourer and two full-time and one part-time laboratory technician. The laboratory is a separate entity, providing services to other plants, departments and organisations, although most of its work is associated with this WWTP. Both WWTP manager and supervisor have been associated with the plant since it was first established. There is always an operator on call by way of a paging system.

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<sup>8</sup> The cover has been in place for three years, although it has a nominal life of only two years.

<sup>9</sup> The vitrification facility uses the sludge that it processes as fuel to dry the incoming sludge before it is burnt at very high temperatures into a solid material which locks up chemical constituents within the inert, glass-like product. While this will still probably be disposed of at the landfill, it is capable of use in other ways, such as roading material.

The legal description of the site includes the Council-operated dog pound, maintenance depot and workshops, the landfill, as well as the WWTP.

The site has controlled access, and entry is by large automatic gates operated by a speaker system. The number of people with permission to access the site is approximately 30. Not all of these enter on a daily basis. Access to the site is controlled by security cards. Because the sludge ponds are full, for the past 18 months extracted sludge has been carted away to Otaki for further treatment and disposal. Three skips are taken each day of the year.

## **Liaison between the facility and the host community**

Complaints from neighbours about the WWTP are directed to both the Wellington Regional Council (WRC) and the Kapiti Coast District Council, and sometimes to the operator directly.

The WRC receives complaints from the Paraparaumu community by way of telephone or letter. It operates an 0800 number which is also used for emergencies such as flooding. The operator pages the Paraparaumu WWTP duty officer. These complaints are followed up by a member of the WRC consents department. A site inspection is offered by way of follow-up. Sometimes the complainant suggests this is not necessary as the effect is dissipating and given the distance between Wellington and Paraparaumu the effect is likely to have gone. The distance factor is considered “*frustrating*” to the WRC officers. A complaints log is filed and if a site visit is made a duty officer from the WWTP will be called out to accompany the WRC officer. Complaints but not names of complainants are passed on to KCDC manager. If the WRC receives a complaint in relation to the water quality of either the Mazengarb Drain or the Waikanae River officers will always phone the KCDC to enquire of any known pollution events in the vicinity. A total of 46 complaints have been logged by the WRC between 16 January 1997 and 2 March 2000. Of these complaints, 44 were about odour nuisances and 2 described pollution in the Mazengarb Drain.

Complaints to the KCDC go to an operator who transfers them to the appropriate department. After-hours calls are directed to the manager of Operational Services or the manager of the WWTP. They have never received any calls at night time, although the supervisor of the WWTP has received calls at night from local residents who know him. The WWTP operators have kept records of complaints received in relation to the plant since 1995. These record the name, address and telephone number of the complainant and any associated comments on the nature of the complaint. A total of 32 local households have been responsible for the 74 complaints recorded in the operators log between October 1995 and 13 April 2000.

Several neighbours were provided with report forms by the KCDC in order to record odour nuisance from the Paraparaumu WWTP in late 1997. This reporting was initiated at the time new deodorising equipment was introduced at the plant. “*The weekly returns confirmed our worst fears that the deodorising equipment was having little or no effect*” according to the WWTP manager.

The case study interviews elicited numerous comments about poor liaison between the Council and residents in the host community around the WWTP. Prior to the most recent resource consent applications for the upgrade presently underway, there was no formalised liaison mechanism between the WWTP operator and nearby residents. However, a Community Liaison Committee was set up in 2000 as a condition of the resource consent. Three hundred letters were mailed out to

residents and submitters to identify individuals who wished to be represented on the Committee. Others were specifically invited.

The Community Liaison Committee is made up of 20 interested parties. These include the Council, the Environment and Heritage Unit (Kapakapanui) of Te Runanga o Ati Awa ki Whakarongotai Inc., the Department of Conservation, Hutt Valley Health, Kapiti Marine Reserve, Kapiti Environmental Action, Waikanae Estuary Guardians and the local ratepayers association as well as individual ratepayers, some of whom were original submitters.

Some case study interviews would suggest that liaison problems have yet to be addressed adequately - *“The community does not own the project”, “we feel in a head-on collision with council”*. Some spoke of *“mis-communication”* and *“mistrust”* with Council. The Committee has recently appointed a facilitator. At the time of the case study fieldwork, one meeting had been held and one workshop at the WWTP itself. During feedback discussions, comments were received from both a neighbouring resident and a Council administrator that the Committee did not appear to be functioning very effectively; very few neighbours had attended the meetings, which were dominated by ‘watchdog’ groups with broader environmental agendas.

## Monitoring

Both the Wellington Regional Council and the Kapiti Coastal District Council are responsible for monitoring effects of the Paraparaumu WWTP. The WRC administers the Air Discharge Permit for Paraparaumu Wastewater Treatment Plant. It is also responsible for baseline monitoring of water quality in the Waikanae River and the Mazengarb Drain<sup>10</sup>. This monitoring covers parameters such as pH and dissolved oxygen levels. A recent freshwater monitoring report for the region (WRC, 1999) noted that the Mazengarb Drain regularly has dissolved oxygen concentrations which do not comply with guidelines and on one occasion had total ammonia concentrations which did not comply with the current water quality guidelines for the protection of aquatic ecosystems. The Drain has small volumes of water which does not allow for much dilution of the pollutants, and a sluggish flow which does not allow for much surface water aeration. It is one of two streams in the entire Wellington Region to have total ammonia concentrations which exceeds the current water quality guidelines for protection of aquatic systems.

Condition 8 of the resource consent requires monitoring of the “Mazengarb Drain and Waikanae Estuary each year between the period January 1 to 8 February for the impacts of effluent discharge on the water quality and the biology of receiving these waters” (Kingett Mitchell & Associates Ltd, 2000). To meet this condition a monitoring programme was designed in 1993 and approved by the WRC. Monitoring surveys have been undertaken every summer since 1994.

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<sup>10</sup> There is currently a case before the Environment Court in which the owner of property alongside the Mazengarb Drain is attempting through research to prove that it is not a natural waterway. If proven, the WRC may have no jurisdiction over the Drain in future .

# C: The Host Community

## Overview

The town of Paraparaumu, in the Kapiti Coast District, is 45 kilometres north of Wellington and situated on the coast between Raumati Beach and the Waikanae River. The township lies on the narrow coastal plain between the Tasman Sea and the Tararua Ranges to the east, near to SH1 and the NI Main Trunk Railway. It is bounded on the north by the Waikanae River, on whose northern bank is the settlement of the same name. The location between the hills on one side and the sea on the other has bearing on its predominant climatic conditions, with winds from the north-westerly and north-easterly quarters predominating.

The area of Paraparaumu and Raumati is in the rohe administered by Te Runanga o Ati Awa ki Whakarongotai.

For most of the twentieth century, the townships of Raumati, Paraparaumu and Waikanae were mainly weekend beach retreats. Growth on the Kapiti Coast has been rapid during the last ten years. Paraparaumu's proximity to the main transport corridors provides easy access to both Wellington City and the Hutt Valley. Thus Paraparaumu now has a significant population of commuters. Approximately one third of its total working population commute elsewhere and two thirds of these commuters work in Wellington city.

The Paraparaumu WWTP is located towards the north-east quarter of the town of Paraparaumu where there are still large parcels of agricultural land interspersed with modern subdivisions and older established sections. The nearest contiguous residential area is to the south-west of the plant, south of Mazengarb Road. Lower density settlement has occurred around the western and north-western perimeter of the plant, further along Mazengarb Road, and on both sides of Ratanui Road. The nearest commercial precinct is just under one kilometre south-east of the WWTP site, incorporating the Lindale Motor Park and Motor Lodge as well as the Community Polytechnic and the Lindale Tourist and Agriculture Centre. Paraparaumu College is situated slightly more than one kilometre west of the WWTP site.

## Catchment and land use

The principal catchment feature in this locality is the Waikanae River, which rises in the Tararua Ranges. It is one of a number of rivers flowing westwards on this part of the North Island, whose upper reaches are "covered by native beech and exotic forest in the foothills" and whose middle and lower reaches are "characterised by several agricultural land uses including dairying, pastoral farming, horticulture and a small number of orchards" (WRC, 1999).

Closer to the Paraparaumu WWTP is the Mazengarb Drain which originates from swampy, low-lying coastal areas, takes a winding route through the Ratanui Lakes and the Mazengarb Reserve before joining the lower Waikanae River near the settlement of Otaihanga. Indeed, the Mazengarb Drain

has several branches<sup>11</sup>, one of which starts in the WWTP property. All are slow-flowing water bodies, passing originally through agricultural land. The colour of the water in the Drain is described as “blackish”. The black colour is thought to be due to the amount of peat in the surrounding properties, and to the impacts of urbanisation in the vicinity. Although called a Drain, it is listed as one of the waterways to be “enhanced” in the WRC Freshwater Plan.

Just west of the WWTP property are the Ratanui Lakes, “a series of small lakelets surrounded by extensive riparian vegetation” (KMA, 2000) and by private, rural-residential properties which prevents general public access. The Mazengarb Drain flows through these lakelets, which from time to time have silted up, requiring excavation.

The nature of the coastal land in the general vicinity of the WWTP - a mix of post-dune wetlands and peatlands - can lead to drainage problems during wetter seasons, while residents often face summer water shortages because of a lack of water storage in the area. Some residents opt to pay for their own bore water supplies, particularly those who wish to maintain attractive private gardens.

## Recreation

Areas of public recreational interest in the vicinity of the WWTP include the lower reaches of the Waikanae River and estuary<sup>12</sup>, as well as the Mazengarb Reserve (hockey, soccer and a gymnastics) and Paraparaumu Domain (Girl Guides, athletics, cycling, rugby and croquet).

According to local Department of Conservation staff, swimming and shellfish gathering are not recommended in the lower Waikanae River. However, one staff member interviewed was aware of fishing for flounder and whitebait. “*Whitebaiting in the tidal zone is common, the whitebait are less than an hour old so not likely to have ingested any nasties*”. The boat ramp at the Oxbow is a popular launching pad for boaties, many of whom leave from this point to holiday in the Marlborough Sounds. Recreational fishers also use this ramp for access to the sea. The mouth of the Waikanae River marks the northeastern-most corner of the Kapiti Marine Reserve.

## Population change

Whilst the area has a history of growth, its population has grown particularly rapidly in the last five years according to KDC planners and two real estate agents interviewed. Paraparaumu was described as the second fastest growing community in New Zealand. By the year 2050 the population of Paraparaumu itself is expected to have risen to 58,000.

The Kapiti Coast has attracted a lot of retired people or people due to retire within a few years. Because of its proximity to Wellington, its attractive climate and less expensive properties, people are

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<sup>11</sup> In addition to the branch which starts inside the WWTP property, there are the Landfill branch (to the north) and the Lindale branch (to the south). On several occasions in recent years, the Landfill branch has had no identifiable water flow in it (KMA, 2000). The Tikotu Drain used to flow eastwards from the coastal dune system in Paraparaumu, but is no longer connected to the Mazengarb Drain.

<sup>12</sup> There is also the Waikanae Estuary Scientific Reserve which begins approximately 500 m downstream of the Oxbow.

choosing to “down sell and move to a new home a few years before their retirement” according to one local real estate agent. There are also a number of young families moving in to the district who are attracted to affordable new homes with less maintenance which suits their busy lifestyle. The number of rental properties has also increased in the last two years according to the real estate representatives interviewed. Young families and students of the Whitireia Community Polytechnic (Kapiti campus) are attracted to the cheaper rentals and the appealing climate with ease of access to the sea and beaches as well as Wellington City.

Two nearby sub-divisions - Chilton Estate and Killilea Place - were both developed in the early 1990s, before the major WWTP upgrade in 1994/95, whilst the most recent nearby sub-division - The Meadows - was developed since the upgrade. A church and a medical centre which service this growing residential population have both opened recently on Mazengarb Road, near Fyfield Place.

Population trends for the period 1986-1996 are indicated in the data presented in Table 1 following.

**Table 1: Growth in Usually Resident Population - 1986-1996**

Area	UR population 1986	UR population 1996	Population change 1986-1996
Kapiti Coast District	29,398	38,584	+31%
Paraparaumu/Raumati	15,094	19,965	+32%
Waikanae	6,305	8,653	+37%
WWTP host community	1,302	2,802	+115%

# **D: Coverage of consultation and Interviews**

## **Focus and timing of consultation**

The main focus of this case study has been on neighbours' experience of the WWTP over the past five years, since the last major upgrade which was completed in February 1995. All interviews were conducted during the week of 24 to 27 of October 2000

## **Numbers and categories of interviewee**

In all 124 interviews were conducted for this case study. Two types of interviews were employed. In-depth interviews aimed at identifying the full range of effects experienced, as well as detailed descriptions of these effects were carried out with people living and working relatively close to the WWTP site (N=54). Rapid appraisal interviews were carried out in order to provide a spatial dimension to the analysis of effects (N=55). In addition, fifteen key informants were interviewed (see below) using a semi-structured format.

## **Areas of interviewing**

Interviews with neighbours of the WWTP were structured to provide responses across a range of separation distances, labelled "near" and "far". Reflecting the fact that many off-site effects from sewage treatment plants are influenced by weather conditions, particularly wind speed and direction, interviews were conducted on properties all around the wastewater treatment plant. However, more emphasis was on properties around the southerly boundaries of the plant (56 interviews), since this area is downstream in winds from the northerly sector (NW and NE) which predominate. This area also has the closest settlements of higher density. There are a number of more dispersed properties within close proximity of the treatment plant to the north/northwest of it. They would be affected by the southerly wind which is less common in the area. The distribution of interviews (by location and type of interview method) is shown in Table 2 on the following page.

## **List of other key informants**

Wellington Regional Council accounts manager consents department  
Department of Conservation field officer  
Kapakapanui of Te Runanga o Ati Awa ki Whakarongotai Inc.  
Kapiti Environmental Action committee member  
KCDC Manager Operational Services  
KCDC Wastewater Treatment Manager  
KCDC Planner  
Two real estate agents  
Whitireia Community Polytechnic (Kapiti campus) teacher  
Dog Obedience School owner  
Deputy Principal of Paraparaumu College  
Sports Clubs representatives (3)

**Table 2: Summary information for interviews**

<b>Interview cluster</b>	<b># interviews</b>	<b>Description of cluster</b>
SW Near	20 total 11 full 9 rapid	Area of Mazengarb Road near Fytfield Place + Chilton Drive Close residential settlement Average # years at address = 7.1
W Near	7 Total 6 full 1 rapid	Along Realm Drive Close residential settlement Average # years at address = 2.4
NW Near	20 total 19 full 1 rapid	Area between northwestern boundary of the WWTP and rear sections accessed off Ratanui Road; north from Mazengarb Road and including Killalea Place Lower density, rural-residential blocks Average # years at address = 7.3
SW Far	29 total 28 full 1 rapid	Area around Palmer Court, Makarini Street, Linwood Drive, Atarau Grove, Awatea Avenue, Sunshine Avenue Close residential settlement Average # years at address = 10.1
NW Far	9 total 7 full 2 rapid	Both sides of Ratanui Road Close residential settlement Average # years at address = 7.1
N Far	9 total 2 full 7 rapid	Both sides of Otaihanga Road Lower density rural-residential blocks Average # years at address = 6.8
Other	5 total 3 full 2 rapid	Further west along Mazengarb Road Close residential settlement Average # years at address = 15.6
Businesses	8 total 8 full	Four in the Lindale Centre on the west side of SH1 Two in the Mazengarb Reserve One on Ratanui Road One on Mazengarb Road near Fytfield place
Recreational	2 total 2 full	On the lower Waikanae River
<b>Whole sample</b>	109 total 86 full 23 rapid	

## Iwi input

For the purposes of this case study, researchers arranged a meeting with Kapakapanui, the environmental representatives of Te Runanaga o Ati Awa ki Whakarongotai. The meeting was held on their marae in Waikanae, and also included a representative of the Department of Conservation, a representative from Kapiti Environmental Action and a local historian.

## Feedback Meetings

Two feedback meetings were held on 12 July 2001 for the purposes of discussing the preliminary findings of the field research. The first meeting, with a KCDC administrator, was extremely helpful in clarifying a number of matters of fact concerning the descriptions of complex arrangements, events

and time sequences. The residents' feedback meeting was attended by only one neighbour<sup>13</sup>. As a consequence, a summary of the preliminary findings of the case study research was mailed out to all who had expressed interest in receiving feedback, with a short list of questions to evaluate the accuracy and balance of the findings. Two written responses were received, both of which endorsed the accuracy and balance of the preliminary findings. One commented on the Community Liaison Group experience to date.

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<sup>13</sup> The residents' feedback meeting had had to be postponed from its original date, due to members of the research team attending a funeral. The one resident who did come, confirmed that he and one other neighbour had been the only residents to turn up at the original time.

# E: Operational effects of the WWTP on neighbours

## Main conclusions

Three off-site effects were reported - unpleasant odours, water quality effects from the effluent discharge, and noise.

Problems experienced by neighbours with unpleasant odours coming from the WWTP operation have been documented in logs of complaints held by both the plant operator (KCDC) and the consent administrator (WRC). The findings of this case study regarding odour effects are generally consistent with these official records. The case study adds detail from a host community perspective.

The introduction of new sludge handling arrangements in 1995, involving the storage of sludge on site for periods of several years duration, created very noticeable and very unpleasant off-site odours with significant negative social impacts. The WWTP was not complying with the conditions of its existing resource consents which prohibited offensive discharges beyond the boundary of the WWTP site. A formal abatement notice in January 1998 gave added urgency to steps already being considered for mitigating these off-site odours. Since then, it would appear that neighbours experience of WWTP odours has improved significantly, although intrusive off-site odours continue to occur from time to time.

Consents have been granted for the construction and operation of a sludge vitrification plant and construction is complete, although the plant had yet to be brought into operation at the time of the case study field work. One condition of the consents is the establishment of a Community Liaison Committee so that a formal liaison mechanism between the WWTP operators and the host community now exists. This is intended to address neighbours' concerns about off-site odours in future.

Although the results of statistical analyses of water quality in the Mazengarb Drain and lower Waikanae River indicate there has been a significant improvement in water quality in these two water bodies, since the WWTP upgrade in 1994/95, in absolute terms they continue to be relatively low water quality sites. This is not all attributable to the effluent discharge from the Paraparaumu WWTP. However, local residents remain concerned about water quality impacts from the effluent discharge and the Runanga continues to express its opposition to effluent discharge directly to surface water. While the case study period from 1995 to 2000 may have witnessed improving water quality (both of effluent and of receiving waters), in the longer-term view a question remains over the use of a small, slow-flowing stream as the primary receiving environment for a WWTP of this size, discharging on a continuous basis.

Off-site noise is rarely the cause of significant impacts from the Paraparaumu WWTP. The source of past noise disturbance will soon be housed indoors and should cause no further nuisance.

## Effects projected and reported

The following table provides a summary analysis of the effects reported during the community-based fieldwork, and compares neighbours responses with expert projections.

**Table 3: Effects projected and reported**

Effects projected	Effects reported unprompted	Effects reported after prompting	Effects projected but not reported or without corroboration <sup>14</sup>	Effects reported but not projected
<ul style="list-style-type: none"> <li>• odour</li> <li>• water quality effects</li> </ul>	<ul style="list-style-type: none"> <li>• odour</li> <li>• water quality effects</li> <li>• noise</li> </ul>	<ul style="list-style-type: none"> <li>• odour</li> <li>• water quality effects</li> <li>• noise</li> </ul>		<ul style="list-style-type: none"> <li>• noise</li> </ul>

In unprompted questioning, 50% of all respondents had observed no effects at all, while in prompted questioning only 14% still recalled no observations of effects.

## Structure for reporting the effects experienced

Detailed analysis of each effect experienced by neighbours of the Paraparaumu WWTP is reported under the following sub-headings:

- What effect do they notice? Source of effect?
- Timing; frequency; trends?
- Mitigation attempts?
- Impacts?
- Summary evaluation

### Odours

Two thirds of all those interviewed reported experiences of unpleasant odours from the WWTP. This included 66 residents and six businesses or community organisations. Forty-four responses came without any prompt, while prompting produced a further 28 responses on odour.

*What effect do they notice? Source of effect?*

Neighbours described the odours they experienced variously as “a sewage type smell”, “revolting fresh sewage smell”, “like a long drop”, “offensive”. Most often respondents thought the odours came from the WWTP in general. Only a few neighbours knew more details about what was actually happening at the plant and mentioned particular problems as sources of odour. Several respondents reported the Mazengarb Drain downstream of the WWTP effluent discharge as the source of unpleasant odours - “Smells like you have put your head down a long drop”.

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<sup>14</sup> Corroborated observations means cases where there are observations from more than two individual local observers, or where an individual observation can be corroborated by other sources of data.

There is some evidence of a pattern in the spatial extent of off-site odour impacts - 81% of residents interviewed in 'near' areas reported odour experiences, compared with 54% of those in 'far' areas. Furthermore, if they lived in 'near' areas they were twice as likely to report experiencing the unpleasant odours both inside and outside their buildings rather than just outside their buildings (34% of responses), than if they lived in the 'far' areas (18% of responses). At the polytechnic (near, SE) "it can come in the building and drifts around" according to a teacher who actively reports any odour events and was part of the 1998 neighbours' monitoring programme.

*Timing; frequency; trends?*

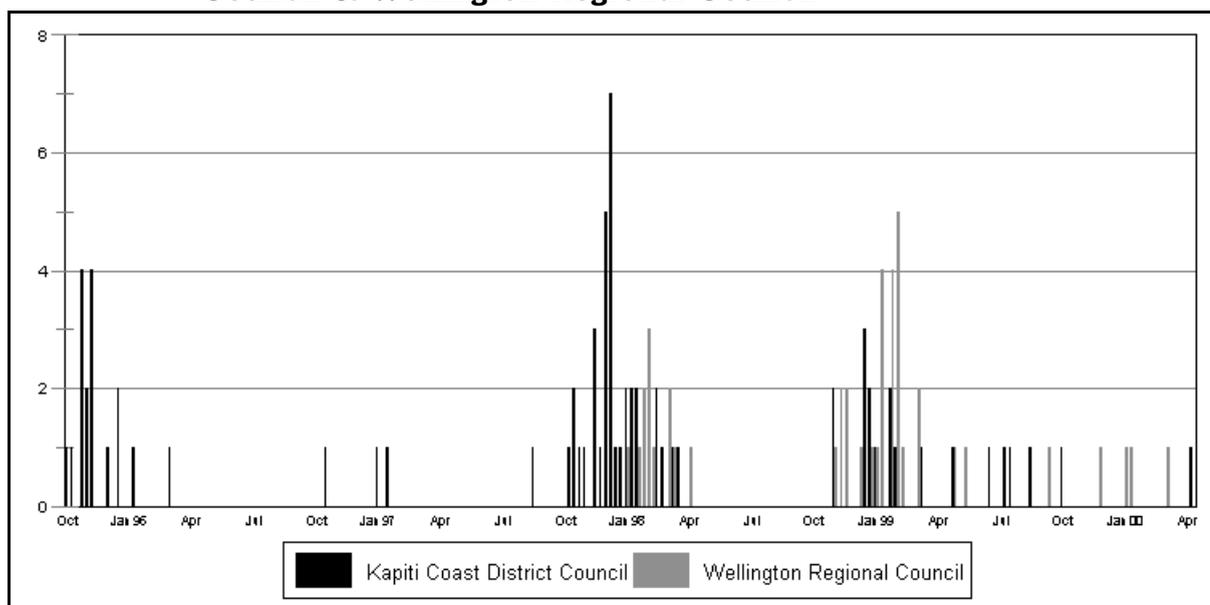
Neighbours' experiences suggest that odours are more likely to be noticeable in calm conditions, although wind direction is also a factor, as the following summary table indicates, based on combining individual responses.

**Table 4: Typical timing and conditions for odour events by area of interviewing**

Area	Typical Timing	Typical conditions
SW near	Mornings, evenings - summer	Warm
SW far	Evenings - summer	Warm, N wind
W near	Mornings	Warm, calm or E to NE wind
NW near	Mornings, evenings	Calm, S wind
NW far	Mornings, evenings	Calm, S to SE wind

There is a marked seasonal pattern with odours more likely to be experienced as worse in warmer, summer conditions<sup>15</sup>. This pattern is reflected in the timing of complaints received - see Figure 4.

**Figure 4: Pattern of odour complaints received by Kapiti Coast District Council & Wellington Regional Council**



<sup>15</sup> Notwithstanding this general pattern, there have been some occasions when bad WWTP odours have been experienced on still, frosty winter mornings.

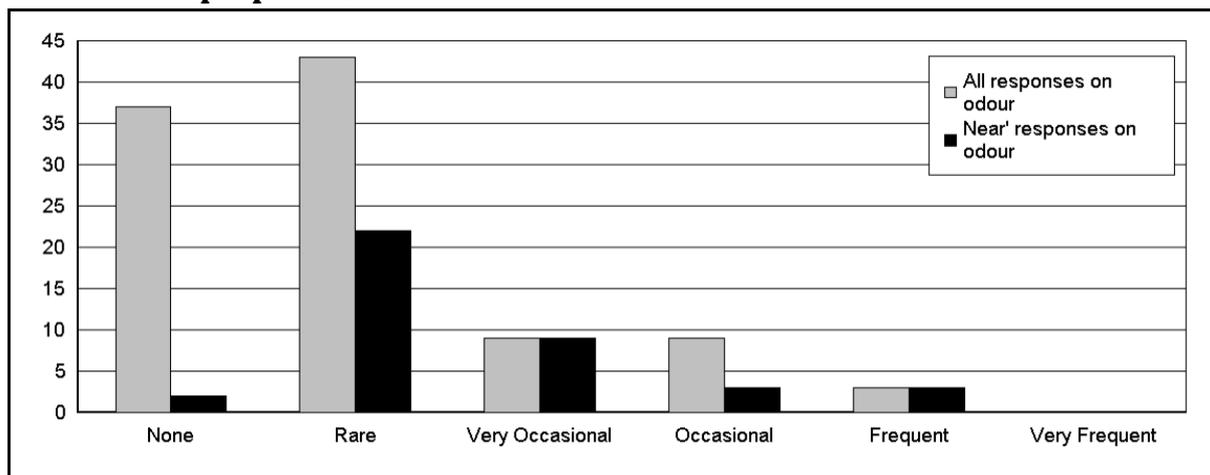
To summarise responses about the frequency of experiencing odours, it is helpful to distinguish different frequencies of occurrence by relating some quantitative indicators to the qualitative descriptors used by respondents, as follows:

**Table 5: Frequency bands for observing effects**

Level - descriptor	Frequency range	Frequency on a monthly basis
0 No observations	0	0
1 Rare, irregular	Few times a year	<0.5x/month
2 Very occasional	Once a month	1x/month
3 Occasional	Twice a week to twice a month	2-8x/month
4 Frequent	Several times (>2x/week)	8-30x/month
5 Very frequent	Daily	30x/month

For all those interviewed who reported experiencing odour effects, the distribution of frequencies is shown in Figure 5. Corresponding data for the ‘near’ areas is included for comparison.

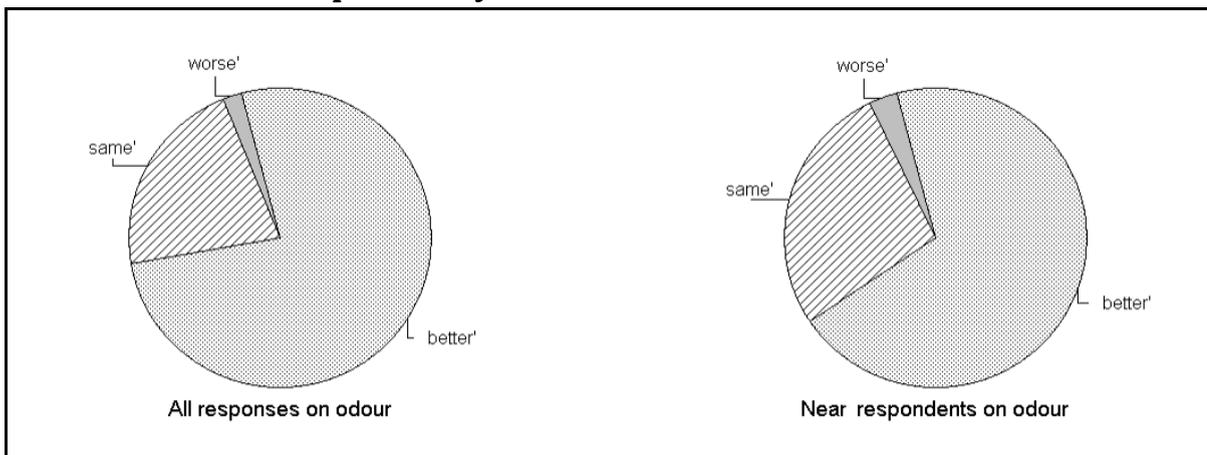
**Figure 5: Frequency of experiencing off-site odours on respondents’ properties**



It should be noted that those responding in the ‘frequent’ category tended to qualify this by saying that odours were frequent in the summer months, rather than all year round. Two respondents reported observing odours on Mazengarb Road from the WWTP frequently or very frequently.

Analysis of responses (refer to Figure 6) suggests that the experience of unpleasant odours from the WWTP has improved significantly, but particularly in the last two years, rather than the last five years. The 1998 “event” which triggered the abatement notice produced very noticeable effects, and the tarpaulins placed over the sludge ponds appear to have made a significant difference in the frequency and intensity of odour effects from this source. The deputy principal of Paraparaumu College, past which the Mazengarb Drain flows on its way to the Waikanae River, commented on smelling an unpleasant odour up to 10 times per year and was not aware of any difference since the upgrade.

**Figure 6: Respondents' comments on perceived trends in odour events over the past two years**



KCDC staff confirm a variety of specific sources of odour within the WWTP. Odours from the sludge holding ponds have been the most prominent, but not the only source.

The WWTP manager confirmed the existence of odour problems with sludge handling during the summer of 1995/96 (KCDC, 1998) (see Figure 4 - odour complaints graph). This document records the sequence of events, including the installation of the dissolved air flotation unit, the survey of some neighbours and subsequent efforts to address these odour problems. The manager noted that *“Within days of this (the DAF unit) being placed in the ponds it produced a horrible stench. This was recognised as being a real problem and soon our neighbours were giving us this message.”*

Other past and present sources of odour were also described by the WWTP manager:

- a “stale smell” at the inlet channel from ammonia released from incoming raw sewage. The manager acknowledged complaints in relation to this, mostly from residents in Mazengarb Road. Although this channel was designed to cope with the intake of 12,000 people, it is now coping with the sewerage from over 19,000 people.
- cleaning out the clarifiers at approximately two-year intervals can lead to odour as some of the sludge remains on inside ledges and is not removed as part of normal operations.
- when the sludge is de-watered. In a light easterly wind, described as rare, the odour can waft through the forested areas into Killilea Place across the western boundary.
- *“the collection of septage lying in pump stations overnight can lead to odour especially on a calm morning”.*
- the septage lagoon.
- removal of sludge to the landfill, which is on adjacent land.

*Mitigation attempts?*

The KCDC was unsuccessful in mitigating the problems from the sludge stabilisation ponds using direct spraying of a deodorising solution. However, these odours have been reduced by applying firstly polyethylene covers over the ponds and secondly a layer of hay, both to weight down the polyethylene and to act as a bio-filtering medium. This was particularly necessary where the polythene cover split after a period of time.

Plywood covers have been placed over the top of the inlet channel, which have helped reduce escaping odours. These covers are raised twice a week in the early morning for cleaning. There were plans to cover the inlet channel with fibreglass covers. However these plans are on hold pending forthcoming changes to the plant occasioned by the decision to upgrade the WWTP to cater for sewage from Waikanae.

*Impacts?*

To assist comparisons, it is helpful to distinguish varying degrees of impact, based on respondents descriptions.

**Table 6: Spectrum of impact severity for odour effects**

Level	Description	Comments
0	No observations reported	
1	No impact at all	No impact; none
2	Noticeable, but not unbearable	<i>It's unpleasant but doesn't really impact on me</i>
3	Loss of personal residential amenity; very unpleasant	<i>Can't enjoy outside and have to keep windows closed.</i>
4	Social discomfort or embarrassment	<i>It's embarrassing if we have visitors</i>
5	Impacts on personal health and well being	<i>It made me throw up</i>

As a generalisation, neighbours in 'near' areas have experienced impacts at levels 2-5, while those in 'far' areas have experienced impacts at levels 1-3. Typical comments from 'near' neighbours vary considerably, from "*first whiff makes me react to it and then I get on with the day and don't notice it*", "*not pleasant, but not much*", "*not there for long, lasts for half an hour*", "*don't let it make much difference*" to "*if we get warning from the council saying they're going to clean out the tanks, we turn on the air conditioning system*", "*forced indoors, sickening, embarrassing with visitors, feel powerless to do anything*", "*it's a physical 'seedy' feeling caused by the thought of what the source is*", "*can't do outdoor activities like barbequeing*", "*not pleasant, tend to stay inside*", "*go off the property - do some shopping and hope it goes away*".

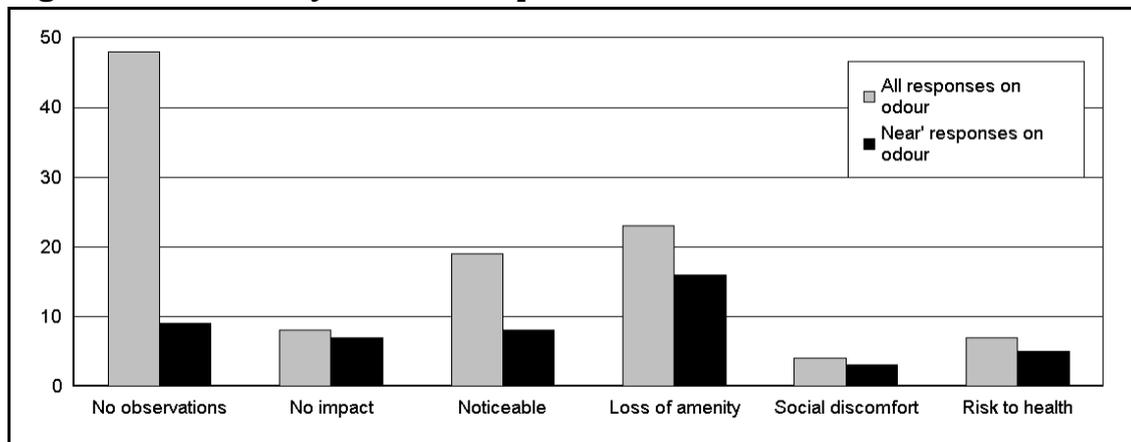
During the worst period of sludge odours in January 1998, WRC complaints records note impacts such as "*dry retch material*", that the odour had been "*detectable as far away as the Jolly Miller west of Paraparaumu College*", and that one family had felt compelled to leave their property one day to escape the unpleasantness.

Monitoring staff from the WRC, trained in odour sniffing, adopt a systematic approach to observing and recording odour events<sup>16</sup>. Sometimes WRC records indicate that staff ratings of odour intensity are significantly greater than neighbours' ratings, suggesting the possibility of de-sensitisation<sup>17</sup> while at other times staff ratings are less than neighbours<sup>18</sup>.

Using the scale presented above, for all those interviewed who reported experiencing odour effects, the distribution of severity experienced is shown in Figure 9. Corresponding data for the 'near' areas is included for comparison.

It should be noted that most of the higher-level impacts reported related to events during or prior to the summer of 1997/98, when the abatement notice was issued. Of the 34 respondents who reported impacts from odour at a level of 3 or higher, only one half (16) had complained, and most of these were to the KCDC or the operator directly. Several sports administrators were spoken with during the course of the interviews, as well as a dog obedience school trainer - all neighbours of the WWTP - none reported a curtailing of recreational activity.

**Figure 7: Severity of odour impacts**



## Summary evaluation

The introduction of new sludge handling arrangements in 1995, involving the storage of sludge on site for periods of several years duration, created very noticeable and very unpleasant off-site odours with significant negative social impacts. The WWTP was not complying with the conditions of its existing resource consents which prohibited offensive discharges (e.g. odour, dust, aerosols) beyond the boundary of the WWTP site. A formal abatement notice in January 1998 gave added urgency to steps already being considered for mitigating these off-site odours. Since then, it would appear

<sup>16</sup> Incident reports frequently contain summaries noting frequency, intensity (0-5 scale), duration, offensiveness (nature of source), location.

<sup>17</sup> e.g. record for 25 January 1998 shows that two WRC staff rated an event at 4-5 out of 10, while two neighbours rated the same event at ½ to 1 out of 10.

<sup>18</sup> This may be due to different sensitivities (as in the footnote above), or because the odour has dissipated since the complainant first observed it

that neighbours experience of WWTP odours has improved significantly, although intrusive off-site odours continue to occur from time to time.

Consents have been granted for the construction and operation of a sludge vitrification plant and construction is complete, although the plant had yet to be brought into operation at the time of the case study field work. One condition of the consents is the establishment of a Community Liaison Committee so that a formal liaison mechanism between the WWTP operators and the host community now exists. This is intended to address neighbours' concerns about off-site odours in future. However, the timing of this case study was too soon to allow any evaluation of the effectiveness of either the new methods of handling sludge, or the community liaison mechanism.

## **Effluent discharge and its effects on ecology, recreational amenity, food gathering and risks to human health**

The effects of discharging treated effluent into a moving body of water are not always easy to discern with the naked eye, and therefore not easily detected by human observation. In some cases, the potential sources of effects and impacts - elevated nutrient levels, the presence of pathogens and other bacteriological species - are invisible. Only the gross aspects of liquid discharge - bubbles, surface scums, suspended solids and discolouration would be evident.

Nevertheless, people have perceptions based on observing various phenomena, and there is no doubt that perceptions alone can alter people's behaviour patterns. At certain locations along the Mazengarb Drain and lower Waikanae River, local people are occasional users of the waterways, although direct contact recreation has been officially discouraged for some years.

Overall, of the 109 local people interviewed, fourteen<sup>19</sup> (13%) passed comment about matters associated with treated effluent discharge and its possible consequences. Of these fourteen, five spoke about effects in the Mazengarb Drain, five mentioned effects in the Ratanui Lakes, and four mentioned the Waikanae River or estuary.

Te Runanga o Ati Awa ki Whakarongotai have stated an objection to effluent discharge direct into surface waters as a matter of policy and principle- "the practice of discharging human waste into our waters - particularly those used for fishing - is an affront to our tikanga and to our obligations to protect resources like this for everyone." (Baker, 1998).

*What effect do they notice? Source of effect?*

### Mazengarb Drain

Local residents' observations about water quality in the Mazengarb Drain are mixed and conflicting, probably due to a variety of reasons including the random and episodic nature of most casual observations. Three of those who commented own or lease properties through which the Drain runs. One described the water as "*more polluted than it used to be 10 years ago, children used to fish in*

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<sup>19</sup> It should be noted that these waterways are not areas of high recreational use. The Mazengarb Drain is a slow-flowing waterway with naturally blackish water; the Ratanui Lakes are totally surrounded by private land thus limiting the numbers of people who can access them; the lower Waikanae River has limitations on recreational use which have been noted elsewhere.

*the drain but cannot now*". Another said that the water level in the Drain and the Ratanui Lakes rises and falls with the activity at the WWTP. However, another neighbour reported the opposite - that the water level in the Mazengarb Drain has stopped fluctuating and is now at a constant level, which they thought was due to the constant flow of the water out from the WWTP. A third said that there had been occasional spills from the WWTP into the Drain, and when that happens he notices scum and foam on the water in the Drain when he drives past his neighbour's property (where the drain flows into the Ratanui Lakes).

Another respondent reported having noticed water quality effects in the Drain along Mazengarb Road - *"up until two years ago, the water in the Drain adjacent to Mazengarb Road was discoloured and had an unpleasant smell."* She has not noticed it since the work on the WWTP was done in 1998, and said *"it is pretty good now"*. Several comments received during feedback discussions also pointed to improvements in overall water quality, and recent sightings of fish.

A fifth person expressed concern about the state of the Oxbow. One long-time resident reported seeing discoloured water entering the Waikanae River at the Oxbow. On an incoming tide this *"brownish water can flow up as far as the Otaihanga Domain"*.

#### Ratanui Lakes

Five residents commented on the water quality in the Ratanui Lakes. Three of these people thought that the problems were a direct result of the operation of the WWTP. They reported that the lakes were silting up, and that there is sometimes a scum on the surface of the lake water. The silting up and the pollution of the lakes is a continuous problem, according to the residents, while the scum on the surface of the water appears to be infrequent, occurring mainly in warmer weather.

#### Waikanae River

Four comments about the water quality in the Waikanae River were recorded. These residents noticed that the water smelled, *"it had a grey, murky slime on the surface"*. Three of these people thought that the water quality was being affected by the WWTP operations, while the other person was not sure what the source of the effect was. Two residents thought that the water quality in the Waikanae was becoming worse, while the other two said they no longer visit the river, so they were unable to comment on a trend.

Secondary data accessed during this case study (abatement notice and monitoring records) indicate that effluent quality has at times been outside the parameters set in resource consents; also that water quality in both the Mazengarb Drain and the lower Waikanae River has improved since the WWTP upgrade in 1994/95. An abatement notice, issued by the WRC on 4 May 1998, records *"effluent quality at the agreed sample point has consistently exceeded the geometric mean of 15 g/m<sup>3</sup> suspended solids"* and *"has consistently exceeded the geometric mean of 500 faecal coliform bacteria per 100 millilitres"* (WRC, 1998). The District Council indicated during feedback discussions that it had been agreed between the KCDC and the WRC that water sampling was being undertaken at an inappropriate location, too close to the discharge point. A relocated sampling point gave results which were within compliance limits.

WRC baseline water quality monitoring (WRC, 1999) recorded that the Mazengarb Drain regularly had dissolved oxygen concentrations which did not comply with current regulations for the protection of aquatic ecosystems, and that on one occasion had total ammonia concentrations which did not

comply<sup>20</sup>. The monitoring report concluded that the Mazengarb Drain was one of five stream sites in the Kapiti District exhibiting poor water quality. The report noted that “All these sites have very small volumes of water, which does not allow for much dilution of the pollutants they receive. They are also located in lowland areas and are surrounded by intensive agriculture. .... they have sluggish flow which does not allow for much surface water aeration.”

More recent monitoring suggests an improving trend. Kingett Mitchell (2000) concluded after the most recent summer monitoring programme “that the overall water quality in Mazengarb Drain and Waikanae River has improved significantly since the upgrade to the PSTP treatment system in 1994.” Analysis carried out on the Paraparaumu WWTP effluent during the twelve months from July 1999 to June 2000 (Allan Aspell & Associates Ltd, 2000) shows that the effluent quality complied every month in terms of bio-chemical oxygen demand, suspended solids, dissolved oxygen, pH and faecal coliform levels.

Interviews with other key informants emphasise the influence of other factors. According to one WRC consent officer interviewed “*we cannot blame the Mazengarb Drain for polluting the Waikanae River. There are a lot of other factors contributing to the pollution of the river and the Drain is at the lowest point in the river downstream so an accumulation of all other pollutants upstream gathers here.*” A representative of the Kapiti Environmental Action Group, while expressing concern over “*the lack of long-term planning to clean up the waterways of Kapiti*”, stated that the Paraparaumu WWTP is not a major contributor to pollution of the Waikanae River - “*there is a lot of non-point pollution from farmland*”. The WWTP manager also pointed out that it is difficult to determine how much of the Drain pollution comes from the number of birds settling on the Drain and on the lakes, as well as stormwater feeding into it and runoff from surrounding land.

#### *Mitigation attempts?*

The KCDC Wastewater Treatment Manager acknowledged the sensitivity of the Mazengarb Drain for local users - “*as it flows past houses, schools and a reserve*”. Since there is reportedly not a lot of flow at the Oxbow discharge point, there is little active flushing of the Drain. He noted that, prior to 1990, the Oxbow has been cut through in order to create better flow.

#### *Impacts?*

Regarding the Ratanui Lakes - these residents explained that the lakes were often a reason for moving to the area; however the poorer water quality in the lakes has meant that people do not use the lakes as they had done in the past, and the aesthetic value of the lakes had decreased for some residents.

The Mazengarb Drain itself is not a location of much activity. However, there is a risk of neighbouring properties being flooded with effluent. The Mazengarb Drain has overflowed on several occasions due to heavy rains in the area. The most recent time recalled was in 1999, where it flooded into the Paraparaumu Domain near the croquet club. Previous flooding was in October 1998 where flooding occurred on properties in Ratanui Road. Some property owners believed it to

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<sup>20</sup>

The Mazengarb Drain is one of only two sites in the entire Wellington Region to have total ammonia concentrations which exceed the current water quality guidelines for the protection of aquatic ecosystems.

be raw sewage that flooded, but the WWTP manager assured them it was bacterial material from the WWTP effluent, as the amount of solids in the WWTP at any one time is minimal. The flooding ponded on one property and had to be sucked out as it lay around for seven days. An odour lingered for several days after this.

Several respondents said they could no longer swim in the river or collect shellfish due to the poor water quality in the lower Waikanae River. However, it would appear that this constraint has existed for many years and the poor water quality is not primarily due to the WWTP effluent discharge.

### *Summary evaluation*

Although the results of statistical analyses of water quality in the Mazengarb Drain and lower Waikanae River indicate there has been a significant improvement in water quality in these two water bodies, since the WWTP upgrade in 1994/95, in absolute terms they continue to be relatively low water quality sites. This is not all attributable to the effluent discharge from the Paraparaumu WWTP. However, local residents remain concerned about water quality impacts from the effluent discharge and the Runanga continues to express its opposition to effluent discharge directly to surface water. While the case study period from 1995 to 2000 may have witnessed improving water quality (both of effluent and of receiving waters), in the longer-term view a question remains over the use of a small, slow-flowing stream as the primary receiving environment for a WWTP of this size, discharging on a continuous basis.

## **Noise**

Off-site noise was reported by six neighbours, all from 'near' areas. Of these, only one commented without prompting and this person was the only person to register a significant impact.

### *What effect do they notice? Source of effect?*

Four described a humming or whirring sound, while two others said they hear machinery noise. In addition to this, one resident also reported banging, and an explosion. The residents said they can hear the noises both inside and outside their houses, and while most of them did not know what exactly was the source of the noise, they said it came from the direction of the WWTP. However, one neighbour attributed the noise to the operation of a centrifuge, which is running continuously, and another to the operation of the aerator.

### *Spatial distribution?*

These noises are heard only in 'near' areas - some to the northwest of the plant and some to the south of the plant. It is possible that some of the machinery noise as well as the banging heard by those to the northwest of the WWTP may in fact be coming from the nearby landfill operation<sup>21</sup> or a nearby mushroom factory.

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21

The landfill is located on land adjacent and to the north-east of the WWTP.

*Timing; frequency; trends?*

Noises are more evident in calm weather conditions; more than half the respondents report noticing noises in the early mornings.

*Mitigation attempts?*

The centrifuge has been put inside a tent and will ultimately be housed inside the new Lemar sludge vitrification facility, which should reduce the noise even further.

*Impacts?*

One neighbour indicated there have been times when he “*can’t sleep at night - even got up to go and check it out; rode down there on my bike.*”

*Summary evaluation*

Off-site noise is rarely the cause of significant impacts from the Paraparaumu WWTP. The source of past noise disturbance will soon be housed indoors and should cause no further nuisance.

## **F: Longer-term effects of the WWTP on settlement patterns and development in the locality**

In exploring the longer-term effects of Paraparaumu WWTP, residents of the host community were asked for their observations<sup>22</sup> on:

1. the major changes that have occurred in settlement pattern in the locality over recent years, and
2. whether the location of the WWTP had influenced the way in which the community had developed.

### **Major changes in land use and settlement**

Land in the vicinity of the Paraparaumu WWTP has progressively been converted from rural and pastoral uses into residential uses, with medium-density suburban and low-density rural-residential styles both evident (e.g. The Meadows development southwest of Mazengarb Road and Killilea Place southeast of Ratanui Road). Previously developed residential areas southwest of the WWTP (e.g. Makarini Street) have witnessed considerable infill housing in recent years. The overall effect of this up until the 1996 census is captured in the census data provided in Section C (Table 1), which shows the exceptional growth rate in usually resident population within the host community of the WWTP between 1986 and 1996. Building consent data obtained from KCDC show that new dwellings have continued to be built in areas close to the WWTP since 1996, although it was not possible to confirm growth rates in a way that would be consistent with the data in Table 1.

Interviews with key informants in the real estate and development sector noted that although there are several local developers active in Paraparaumu, there are also outsiders from the three main cities of Auckland, Wellington and Christchurch “*scouring the land for future development*”. In recent times there has been at least one enquiry per month processed by the KCDC with a request for a zone change to permit development. A developer has bought land next to the WWTP with the intention of creating a new subdivision. Longer-term plans for the area include a major arterial road development, known as the Western Link Road which would have to cut through several significant residential sub-divisions. If this proceeds, it will pass directly adjacent to the western boundary of the WWTP and undoubtedly have a much more profound impact on the host community than the WWTP.

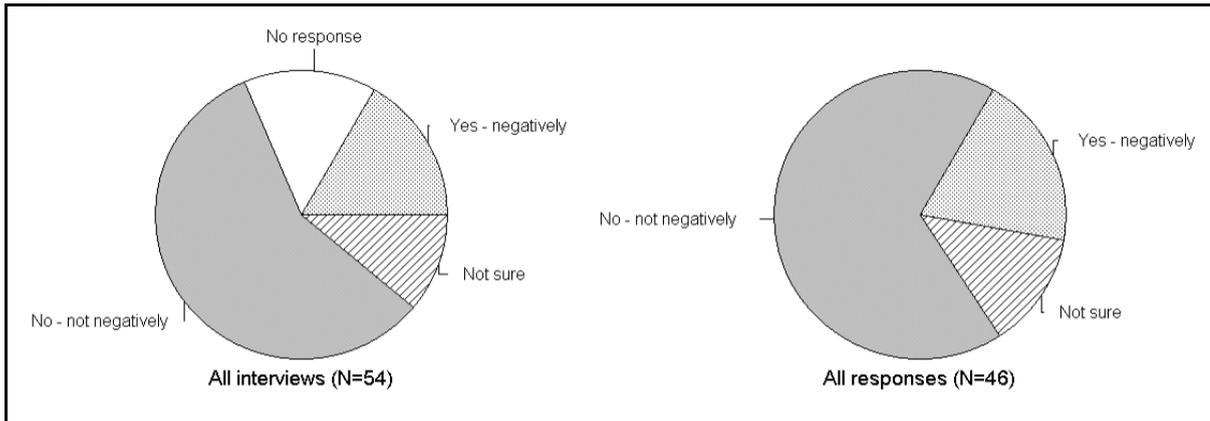
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<sup>22</sup> This occurred only in full interviews, hence N = 54.

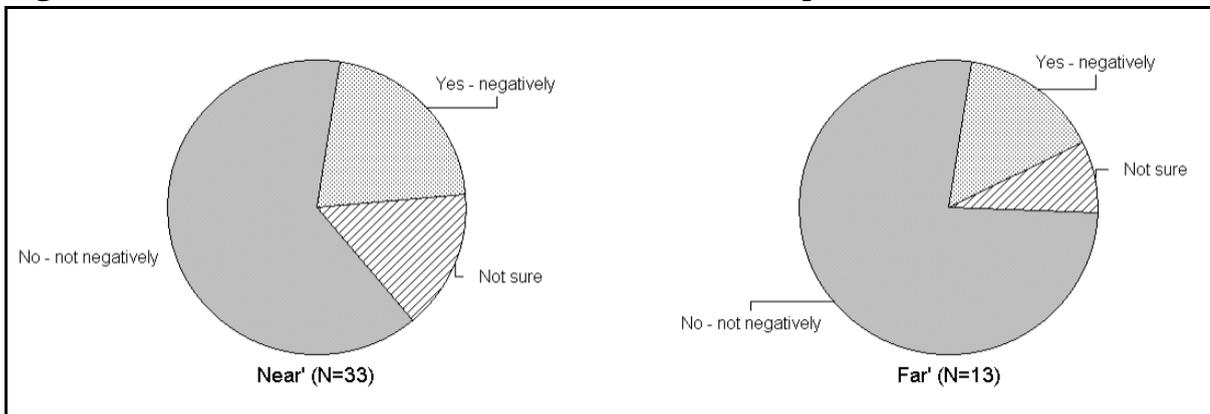
## The influence of the WWTP on the settlement pattern in the locality

The WWTP has been operating on its present site since 1981, with several upgrades having occurred during that time. Analysis of responses to the question on whether or not the presence of the WWTP has influenced development in the host community indicated two-to-one that the facility has not had a negative influence - see Figures 8 and 9.

**Figure 8: WWTP’s influence on local settlement patterns**



**Figure 9: WWTP’s influence on local settlement patterns**



Among those who expressed the majority (67%) viewpoint, comments were:

- “People consider this an up and coming area - so no”
- “Hasn’t stopped people building all around; it’s surrounded by trees, so a lot do not know it’s there”
- “Infill housing has gone ahead”
- “Still developed, and is developing”
- “Most people would be unaware of the treatment plant; it’s visually well screened”
- “One neighbour sold because she didn’t like the smells; but her family had also outgrown the size of house”
- “ There’ve been some big houses developed nearby”

Negative views were expressed by 20% of respondents, with associated comments:

*“If people smelled it, they wouldn’t build near it”*

*“The LIM report and real estate people have put off friends wanting to buy into the area”*

*“It has a reputation - problems selling”*

*“Not keen on swimming in the river - even up to the reserve”*

A few were not sure either way:

*“Not sure - new estates being built; the best time to sell a house is in winter, not summer”*

*“Hard to say - the plant was there already”*

## REFERENCES

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Paraparaumu WWTP property, surrounded by pine plantations.



The Mazengarb Drain - various views on its route to the Waikanae River

